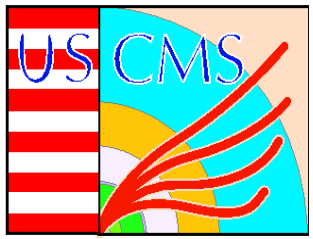
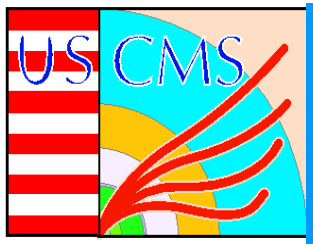


CMS Database Report

Lee Lueking

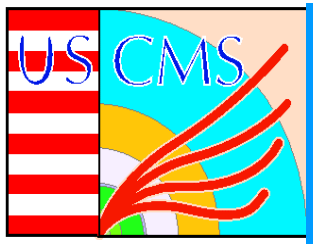
CMS Activity Coordination Meeting

November 23, 2004



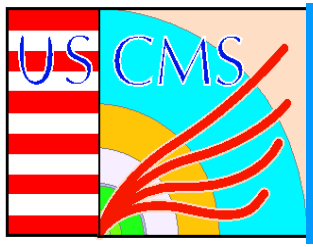
Overview

- HCAL DB progress
- General organization of DB effort in CMS (report from CPT week)
- An interface for CMS offline applications using Frontier approach
- LCG 3D progress; Distributed Database Deployment



HCAL Testbeam DB Goals

- Explore CMS db environment and needs.
- Design and build components to be used and tested during the test beam operation.
- Use the testbeam experience as a prototype for the full scale db.
- Four areas defined by CMS for databases:
  - Construction
  - Equipment management
  - Configuration
  - Conditions (calibration + monitoring/slow control info)



HCAL TB DB Accomplishments

- Deployed development and production servers at Fermilab (3) and CERN (1)
- Developed use cases and requirements
- Designed, reviewed, implemented schemas
- Provided interfaces for loading equipment configuration, calibration, and monitor databases.

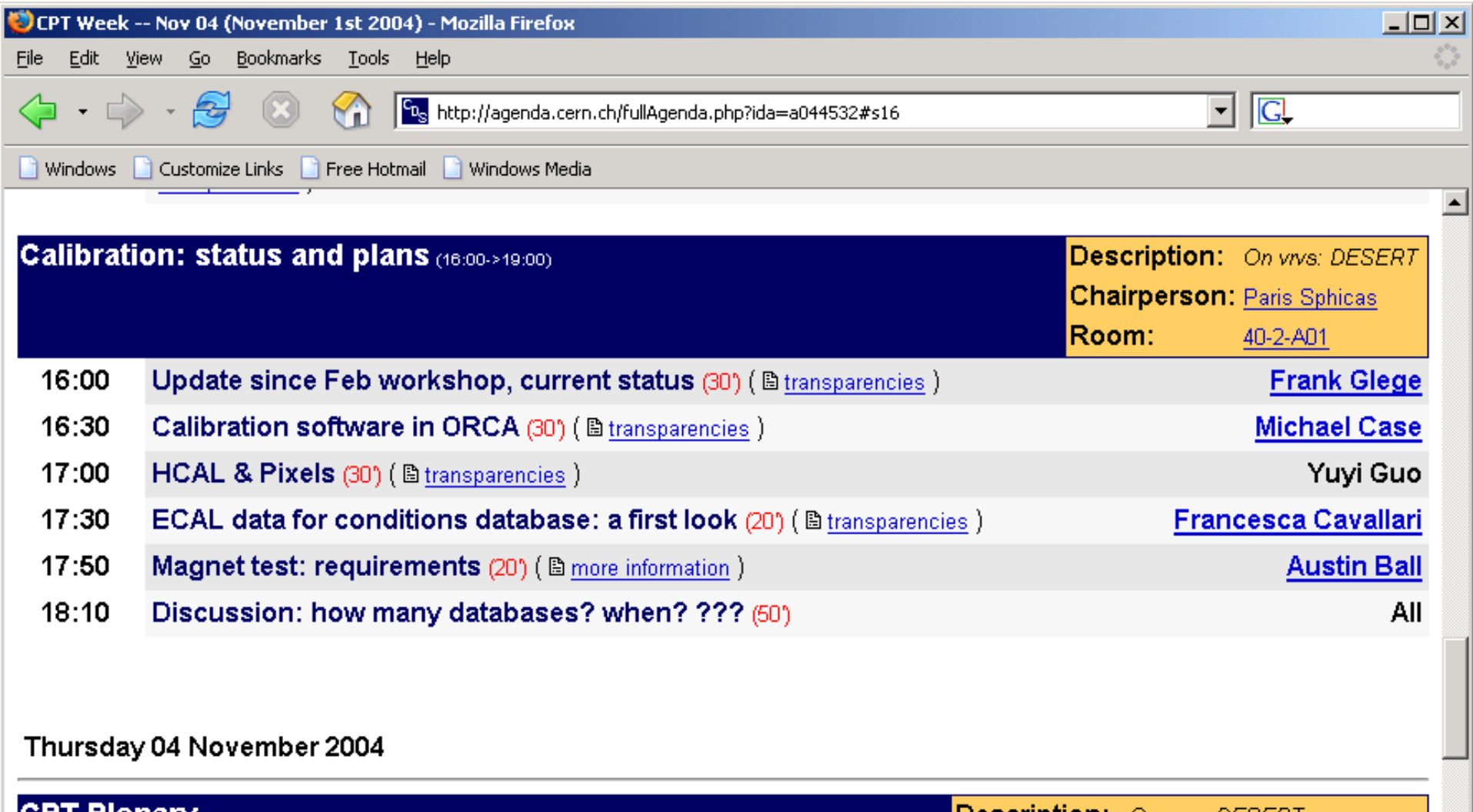
HCAL TB DB Details

- Calibrations, equipment configurations, and slow controls db on Fermilab Oracle 10g server.
- Slow controls db on CERN Oracle 10g server.
- Calibration and equipment configuration dbs have Java interface using ObJectRelationalBridge (OJB).
- Sqlloader, PL/SQL scripts and Borland C++ used for SC interface.
- Web interface is under design for browsing.

HCAL TB DB Loading and use

- About 1 million rows of pedestal, gains and wire source calibration loaded (~361MB).
- Some HCAL Barrel test beam modules (4 RBXs, 16 RMs, 80 HPDs, ODUs and QIEs) (~16MB).
- About 100 million rows of SC data loaded (~20GB).
- Test beam operations ended in October, Plan to use conditions DB info in ORCA soon…(more later)

CPT Week Conditions DB Agenda



Data flow

Online Master Data Stora

Equipment Configuration & Conditions

Create rec conDB data set

Offline Reconstruction Conditions DB ONline subset

Calibration

Conditions

Configuration

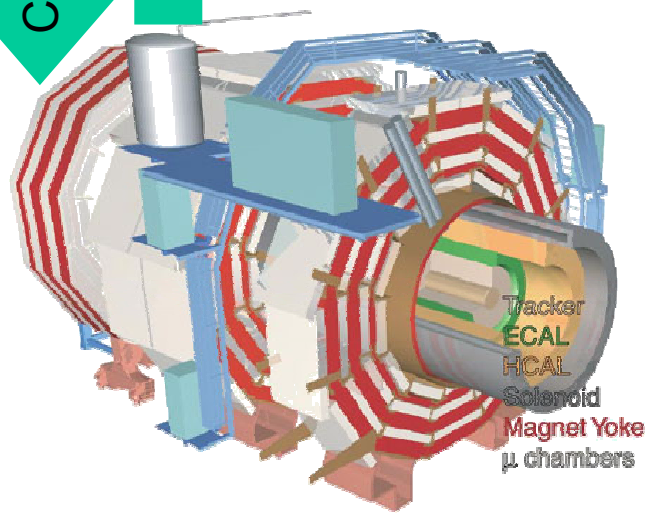
Conditions

Bat 513

Master copy

Offline Reconstruction Conditions DB OFfline subset

LCG

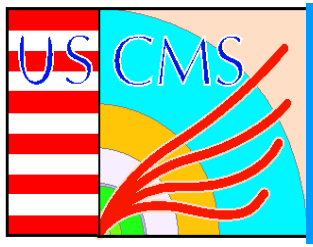


LCG LCG LCG LCG LCG

Coordination Responsibilities

Frank Glege

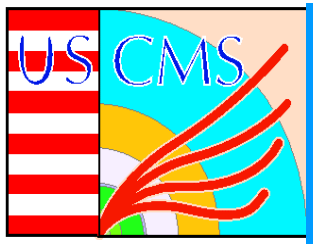
Lee Lueking &
Michael Case



The Magnet Test

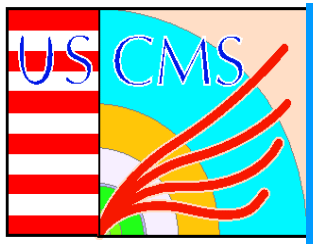
a.k.a Slice Test

- Occurs in October/November 2005 timeframe
- The aim for the magnet test is to have:
  - schemas implemented for all sub systems
  - DBs filled with initial data
  - Complete data flow chain from, and to, the final data classes.
    - Configuration data for detector set up
    - Conditions data as logging
    - Strip of conditions data for ORCOF
    - Copy ORCOF data to B513
    - Use B513 data in reconstruction



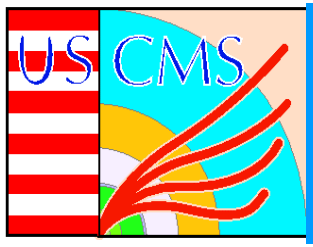
CMS Database Project WG Short-term Goals

- Draft a road map document for the Dec. 6, 2004 CMS Week Meeting.
  - Glossary
  - Descriptions, use cases, and requirements for all sub-detectors' DB needs.
  - Ground rules
  - Interfaces where identified
  - Milestones and Goals
- Have one or more ORCA application accessing data from a real DB by CMS Week.
- Database design training end of January at CERN



Interface for ORCA to DB

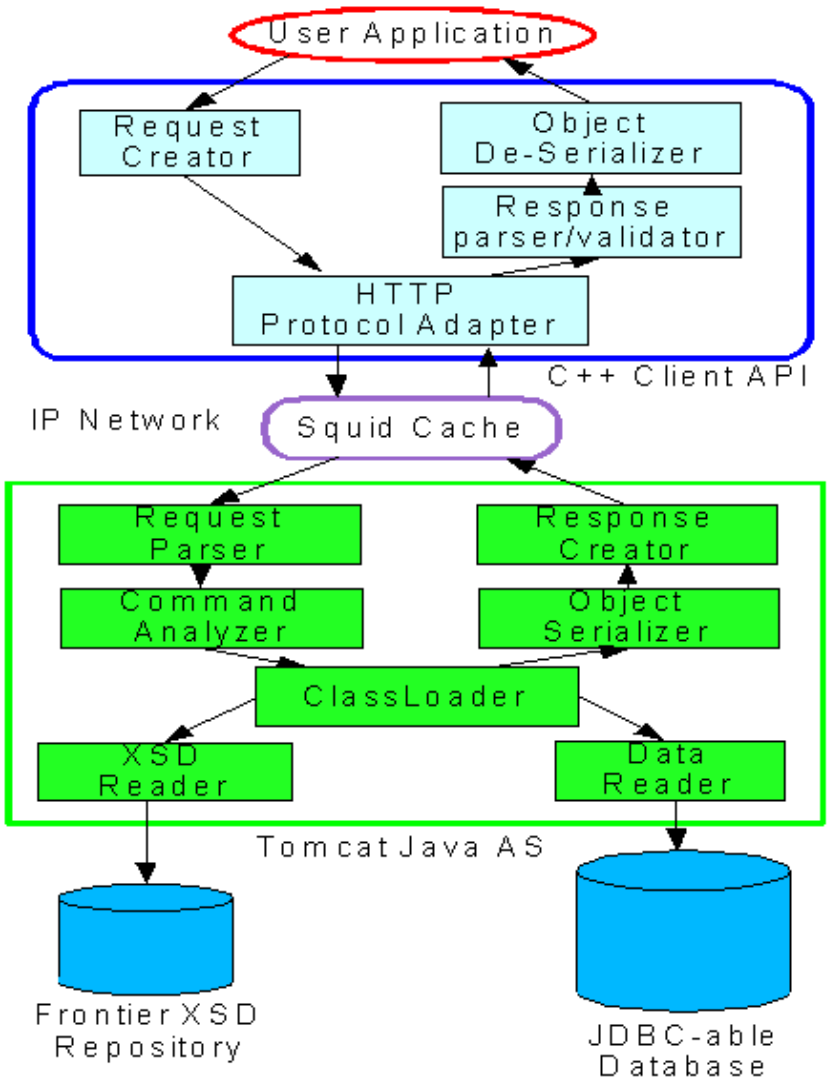
- During CPT Week, and again during Vincenzo's visit to FNAL, we discussed the interface for offline applications (ORCA in particular) to the database.
- General approach is a two phase interface (IOV=Interval of Validity):
  - Client request 1: GetIOVandCondObjectID(eventTime, ObjectType, Tag [or version])
  - Source response: Valid IOV, ObjectID
  - Client request 2: GetCondObject(ObjectType, ObjecID)
  - Source Response: Data Object (encoded vector of pedestals, gains, voltages, etc.)
- This approach is similar to existing interface in COBRA/CARF which uses OCCI (Oracle C++ library) and Conditions DB API (LCG).
- Push to use the Frontier approach with client API to also fill this role.

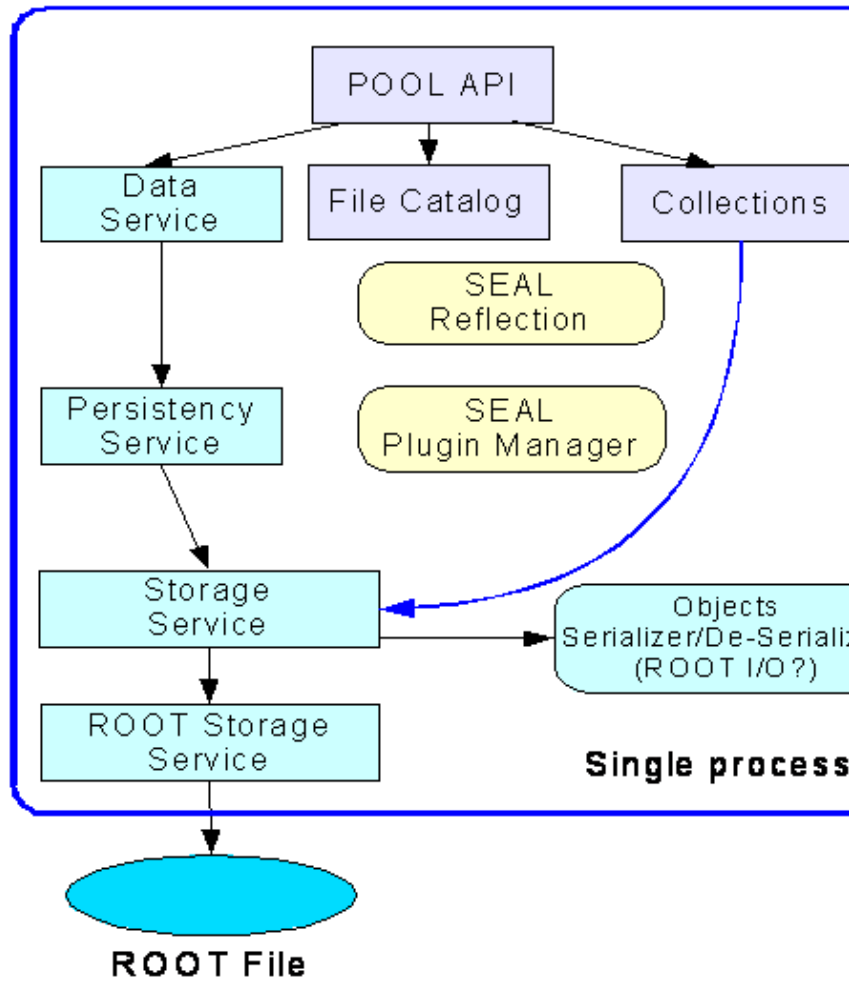


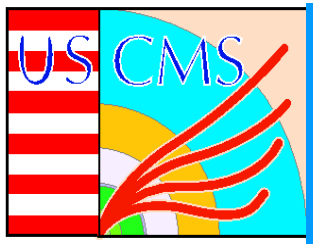
ORCA, COBRA, or POOL

- In the last two months, Sergey Kosyakov (DBS) has built a working POOL/Frontier “plugin” example.
  - Exposes some conflicts between POOL and Frontier.
  - Is less efficient and more complex than Frontier alone.
  - Anticipate will require quite a long time for LCG/POOL team to integrate.
  - Nevertheless, this is of interest to both CMS and LCG/POOL.
- In the short term, it was decided, to use the Frontier client API directly in ORCA, and migrate to COBRA when polished.
- We are very close to achieving the goal of reading HCAL Testbeam DB’s into ORCA through Frontier.

Frontier & POOL (Simplified)

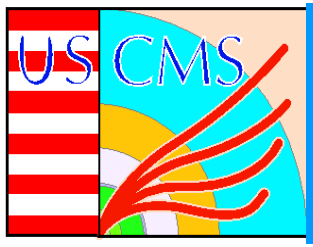






LCG3D

- Organization (lcg3d.cern.ch):
  - Services definition and Implementation
  - Data inventory and Application Requirements
  - Technology Evaluation
- Regular ~weekly phone cons
- Productive visit to FNAL by Dirk Duellmann October. Participation with ANL and U. Chicago. http://lynx.fnal.gov/dbswiki/Lee_20Lueking
- Workshop at CERN December 13-15. (agenda under development: http://agenda.cern.ch/fullAgenda.php?ida=a043872



Services Definition

- Participants in this working group represent the service infrastructure of the particular site.
- Contribute to the definition of a common database and distribution service which is provided to worker node and grid service applications
- Tier 1 sites represented: ASCC, BNL, CCLRC-RAL, CERN, CNAF, FNAL, GridKa, IN2P3
- Tier 2 sites represented: ANL/U. Chicago

Data Inventory

Microsoft Excel - CMS-Inventory081104

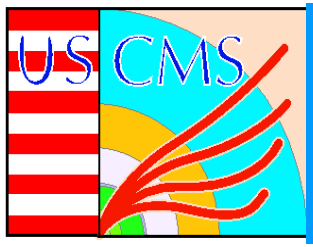
File Edit View Insert Format Tools D

D13 =

	A	Distribution [none/fan out/gath	Tier	Source/Producer	Volume [GB/site]	# of clients / site	access mode [r/w/u]	owner [1-user/n-user/1-site/n	write/update rate [MB/d]	Max. Latency [mins]	RAL used [y/n]	Oracle_Imp [y/n/partial]	MySQL_Imp [y/n/partial]	s/w responsible
1	Application/Data Type													
2	local file catalog	None	0	local	2	n/a	wur	nu/1site	n/a	n/a	p	y	y	Lassi/Tony
3			1	local	2	n/a	wur	nu/1site	n/a	n/a	p	y	y	
4			2	local	2	n/a	wur	nu/1site	n/a	n/a	p	y	y	
5			3	local	2	n/a	wur	nu/1site	n/a	n/a	p	y	y	
6														
7														
8	replica catalog(TMDB)	None	0	local	5	150	wur	nu/1site	n/a	n/a	n	y	y	Lassi
9		**or**												
10		P2P	0	T0	5	150	wur	nu/1site	n/a	n/a	n	y	y	
11			1	T1	2	150	wur	nu/1site	n/a	n/a	n	y	y	
12			2	T2	1	150	wur	nu/1site	n/a	n/a	n	y	y	
13														
14	metadatasystem(RefDB)	None	0	local	1	n/a	wur	3u/1site	5	n/a	p	y	y	Lassi/Werner
15		**or**												
16		Fan out(Q2)	0	T0	1	n/a	wur	3u/1site	5	n/a	p	y	y	
17			1	T0	0.5	n/a	r	0	0	n/a	p	y	y	
18			2	T0	0.5	n/a	r	0	0	n/a	p	y	y	
19														
20	CARFmetadata	n/a	0	0	0.5						y	n	n	Vincenzo
21			1	1	0.5						y	n	n	
22			2	2	0.5						y	n	n	
23														
24	ConditionsDB	None	0	T0	50	n/a	wur	nu/1site	n/a	n/a	n	y	n	Lucia/Werner
25		(Squid model)												

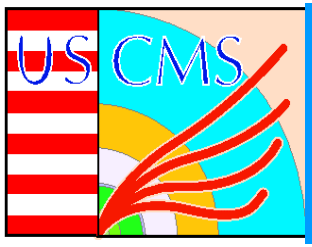
Sheet1

Ready



Technology Evaluation

- Conditions DB conversion using perl scripting: finished
- Oracle to Oracle streams based replication: work in progress (input form FNAL experience)
- Oracle to MySQL bridge using streams based log extraction: work in progress
- Web Proxy Cache evaluation: work in progress (Frontier)



Summary

- HCAL testbeam database effort was very useful to understand CMS. Provided some utility to testbeam as well.
- Progress is being made to coordinate CMS database effort for both online and offline.
- An interface has been defined for applications and we are using Frontier for DB access.
- The LCG3D activity is coming together. FNAL is playing major role in Services Definition and infrastructure area. (DB operations). Also technology areas of oracle replication and web caching.(frontier).